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A number of the bands have recently been photographed with a dispersion of three dense flint prisms. They all appear to have the same general features, as follows: A pronounced maximum is near the violet edge of the band, flanked on either side by a subordinate maximum. To the red of this group is a broad minimum, or absorption-line, while still farther to the red is a group of maxima and minima giving the appearance of four absorption-lines. With low dispersion this group was observed in most of the bands as a broad and diffuse absorption-line (see Table I, column 5). An intensity-curve drawn from a Mills spectrogram of the band at λ 435 is reproduced in Figure 9. Further than to note these general characteristics, the spectrograms referred to have not been studied.

The bearing of the foregoing observations upon the various theories of new stars is reserved for a future paper.

It is greatly to be regretted that the delicate details of the original negatives are so largely lost in the reproductions.

Acknowledgments are due to Dr. H. M. REESE for assistance in taking many of the photographs and in reducing some of the measures.

W. W. CAMPBELL,
W. H. WRIGHT.

September 12, 1901.

MOTION IN THE FAINT NEBULA SURROUNDING *NOVA PERSEI*.*

A negative was secured with the Crossley reflector on the nights of November 7th and 8th of the region about *Nova Persei*, having a total exposure of 7^h 19^m. Very faint nebulosity is shown on all sides of the *Nova*, the most pronounced being to the south. Several broken and irregular streamers are shown in this direction to a distance of 6′ from the *Nova*, while the brightest mass of all is very close to the star on the southwest side, so close as to appear to join it. There are several quite well marked condensations in the form of wisps on the outer edge of the nebulous area to the south. This series of wisps is concave toward the *Nova* and forms a streamer which may be the outer portion of a spiral or a portion of a conic section other than a circle. The end of this streamer farthest from the star is the strongest and is of a very peculiar forked form. To the north there is considerable very faint nebulosity, but without any particular structure.

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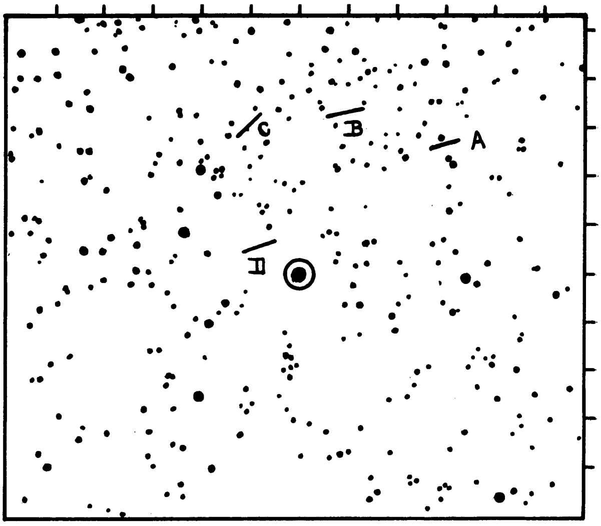
* Abstract from Lick Observatory *Bulletin*, No. 10.

The bright mass about 6′ south of *Nova* was discovered by Professor MAX WOLF* on negatives taken with his doublets on August 23d with an exposure of four hours.

This and a large amount of new nebulosity were photographed by Mr. RITCHEY† at the Yerkes Observatory with a two-foot reflector of short focus, on September 20th.

A comparison of the negative taken with the Crossley reflector and the reproduction of one secured by Mr. RITCHEY showed that remarkable changes had occurred in the positions of the four most pronounced condensations during the interval of forty-eight days. The accompanying diagram shows the position of the *Nova* and surrounding stars. The lines marked A, B, C, D, represent the amount and direction of motion of the four condensations already referred to. The left-hand, or northwest, end of the line shows the position of the center of figure of each condensation on September 20th, while the right-hand, or southeast, end shows its position on November 7-8th. It will be seen that in the interval each mass suffered a displacement of about 1½′, or at the rate of 11′ per annum. The directions of motion do not indicate clearly the general character of motion of the nebula; it is certainly not radial, but further than this it is not possible to say. The observed motions may be irregular, spiral, or recti-



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[*]Astronomische Nachrichten, No. 3736. †*Astrophysical Journal*, XIV, 167.

linear. The photographs, as well as the visual observations, show no appreciable proper motion in *Nova*, nor does there appear to be any abnormal parallax to the star. Hence if we assume that the *Nova* and its nebulous envelope is no farther away than the *nearest* known fixed star, the observed displacement shows a velocity of about 2,500 miles per second. Should the nebula be at a *greater* distance, or not be moving directly across the line of sight, this velocity, great as it is, would be still larger.

The enormous velocity indicated in the nebula leaves little doubt that it is closely connected with the outburst which caused this star to become so brilliant.

Whether the nebula is a product of the outburst or was present at the time, there seems no way of telling at present.

Several theories have been advanced to account for the phenomena witnessed in connection with new stars. One of these, which has found many supporters, is that a collision or near approach has taken place between two solid and comparatively cool bodies, or that a solid body has encountered a nebula or swarm of meteors. The evidence of such excessively great velocities strengthens the belief that, whatever the cause, the outburst is due to some great catastrophe.

A photograph was secured with the Crossley reflector on the nights of November 12th and 13th with a total exposure of ten hours. The plate used was more rapid than the first, and the resulting negative shows greater strength in the nebula as well as a greater amount of the structure. The nebulosity does not extend appreciably farther from *Nova* than in the earlier photograph, however.

Mr. JOEL STEBBINS, Fellow in Astronomy, assisted in obtaining the photographs with the Crossley reflector.

C. D. PERRINE.

MOUNT HAMILTON, CALIFORNIA, November 10, 1901.

Postscript.— It is a pleasure to add that on November 11th (the day following the announcement of the above discovery) confirmation in the form of the following telegram was received through Harvard College Observatory:—

"RITCHEY states photograph Yerkes, November 9th, confirms large-motion nebula near *Nova*."